

On some features of the ETIOLOGY and

TREATMENT of OXYURIASIS

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The life history of the *Oxyuris vermicularis*, though well known up to a certain point, distinctly shows gaps which have to be largely filled up by speculation. The history of the ova, from the time of their being voided till the time when they, having entered the same or another human host, arrive at that part of the bowel where they can proceed to develop into mature worms, is not fully known. It is variously stated that the ova, which are supposed to adhere to the hair of the parts surrounding the anus, are carried by the fingers in scratching and thus conveyed to the mouth of the original host, that they are discharged into drains, where they may reach and contaminate water supplies, or that, being /

being voided upon the ground they may, the faeces having been used as manure, contaminate vegetables used as salads or otherwise eaten raw after imperfect washing. There is, however, a very considerable lack of definite evidence as to the exact mode of transference.

An objection to the idea that the ova are necessarily carried from the region of the perinaeum on the hands and so conveyed to the mouth is that attacks occur in adults susceptible to the disease, where their habits of cleanliness, more especially when, from an idea that this mode of infection is possible, special precautions as to washing the hands carefully after defaecation are observed, preclude from a practical point of view the possibility of this mode of infection occurring in anything like all the attacks to which such a susceptible person is /

prone. Then, again, as regards dissemination by water supply it is a mere matter of speculation to regard the latter as a medium, as the ova, despite their figuring in plates in text-books dealing with water-supplies and their impurities, are seldom, if ever, found even in badly tainted water-supplies. Nor has examination of garden soil manured with the excreta of human beings revealed the presence of the ova of the parasite, and, seeing how comparatively few vegetables are eaten raw and with their "skins" on in this country, such a mode of infection need hardly be seriously considered.

A statement frequently made in text-books of medicine is that, while the parasite needs no intermediate host, it needs to spend part of the cycle of its existence outside the human body, and must be conveyed to the intestine viâ the mouth before /

before it can develop beyond the embryo stage. It certainly is not in accordance with the usual habit of parasitic worms to be able to spend their whole life cycle for an indefinite number of generations within the same host without leaving him, but it is no more logical to assume that a particular parasite cannot, at any rate sometimes, do so, merely because other parasites obviously do not, than to assume that it is impossible for, say *Ascaris* to pass from man to man without an intermediate host merely because other intestinal parasites mostly do have one.

It is obvious that, the course of the intestinal contents being constantly in the downward direction, no amount of local development of generations of worms in the large intestine could keep up the race unless occasionally they were reinforced from above; but from a study of the circumstances which /

which appear to bring on attacks in susceptible adults where such modes of infection as are discussed above can be excluded, it seems difficult to avoid the conclusion that sometimes, at any rate, actual re-inforcement through the mouth need not necessarily precede an "attack of worms" in those in whom a few of the worms are probably always present between the attacks. The cœcum is well known to be a favourite site for large colonies of the oxyuris, and here, if anywhere, they could secure that partial protection from the effects of peristalsis which would be necessary if they were to be able to complete more than one cycle in the intestine of one host.

SUSCEPTIBILITY :

Though, as with other intestinal parasitic diseases, /

diseases, Oxyuriasis is discussed by the writers of text-books with an assurance as regards the prompt success of certain classic treatments that appears rather unfounded to those who have made a special study of intestinal parasitic diseases, the fact remains that, while temporary relief of the symptoms and even the disappearance of the parasite from the stools can easily enough be temporarily secured by means of the usual anthelmintics with a reputation as specific against the Oxyuris, such as enemata of Quassia or salt and the use of certain laxatives; yet the patient is by no means secured by the apparent success of those measures against a very speedy recurrence of the disease under certain circumstances, should he be one of those who are unfortunate enough to be specially prone to it.

I refer more particularly to the case of
adult /

adult sufferers, for it is only in them that chronic Oxyuriasis constitutes really a serious disability.

In children, as is well known, it is common enough, and though convulsions and other serious functional disturbances have at times been ascribed to it as their cause, it cannot, for the most part, in their case be considered as a serious depressant to the general health. Most children get over the susceptibility to Oxyuriasis sooner or later; but it is when the liability persists on into adult life that it becomes the dreaded torment that it is to those susceptible to it.

This susceptibility to Oxyuriasis in particular individuals is a point insufficiently appreciated but which is a very important one not only from a clinical, but also from an aetiological standpoint.

THE TYPE OF SUFFERER :

In most of the cases that are observed in adults the element of personal liability to Oxyuriasis appears, partly, at any rate, to depend upon a weakness of some part of the digestive system, the sufferers being frequently persons of weak gastric, and possibly of weak intestinal digestion. They are frequently persons who, to use the popular phrase, have outgrown their strength, and are tall, thin and "weedy." In many, however, the presence of the disease causes such serious depression, not only mental, but also physical, that the emaciation noticeable in them is obviously at any rate partly a result of the oxyuriasis, and not merely an expression of the gastric and intestinal weakness that predispose to it.

So much is this the case that it is sometimes possible /

possible to tell on meeting a person one knows to be liable to attacks of Oxyuriasis that he is at the time tormented by one, there being a degree of just that difference observable between his facies under this condition and his facies while in health that one can observe in a patient liable from time to time to devitalizing attacks of other diseases to which particular persons are liable, for example malaria. There is a drawn and pinched, unhappy look, not perhaps so obvious to strangers, but quite noticeable by one who knows the facies of the patient in health.

THE SYMPTOMS OF THE DISEASE :

The above is a frequently observed sign of the condition. As regards symptoms, they are such as are more or less common to sufferers from other parasitic /

parasitic intestinal disorders. Itching of the anus and nose are the symptoms from which the condition in the case of children is usually suspected, and in their case I have frequently found that some alarm has been caused by the appearance of blood in the stools, caused apparently by the straining at stool to which they are tempted by the anal irritation which they feel.

Adults frequently complain of marked mental depression and a general feeling of unfitness for work, which may act as warnings to them even before there is much anal or nasal irritation. Actions requiring for their performance skill and therefore fine co-ordination are apt to be interfered with. For example, I have been told by a patient that at such times it was impossible for him to properly enjoy a game of tennis, as he never could be sure of /

of placing the balls properly, and that his accuracy of aim in shooting was similarly interfered with. In the same way capacity for mental work is apt to be lowered, and the patient feels disinclined for mental as he does for physical work. The mental depression frequently shows itself in the shape of irritability of temper, a sign that often indicates to other members of the family a recurrence of what the patient is known to be liable to.

As with the other symptoms generally noted as occurring in different cases of helminthiasis, such as irregular or voracious appetite, uncomfortable sensations in the abdomen, salivation, and even grave disturbances of the nervous system manifested by convulsions, those symptoms I have described are explicable enough when we consider the irritant effect /

effect of the presence of even one small parasite on a part of the body so richly supplied with nerve terminations specialized to transmit sensory impressions to the brain; and when we consider what enormous numbers of the parasite may exist in the intestine of one person, as shown by post-mortem examination or by the administration of some of the more thorough therapeutic measures employed, such as intestinal irrigation, we cannot wonder at their causing very marked nervous disturbances that may be indicated in very varying ways.

It is perhaps unnecessary to account for irritation of the vagina and consequent masturbation in females suffering from the disease by ascribing those to irritation caused by the escape of worms from the anus and their access to the vagina, there to set up local irritation. Such phenomena are quite /

quite well enough accounted for by the presence of the parasites in the intestine and the irritation there set up which, if it manifest itself reflexly by irritation round the anus and in a part of the body so far distant as the point of the nose, may surely occasionally also cause local irritation in a part so intimately associated as regards nerve supply with the intestine as the vagina.

COMPARISON of its EFFECTS AS COMPARED WITH THOSE
OF OTHER PARASITES:

Though the fact of chronic Oxyuriasis in adults not being a very common disease prevents its being realized by the profession in general, the study of even a short series of cases is sufficient to convince one that there can be hardly any one of the parasites of the intestine which, in those liable to recurring attacks by it, causes so great an amount /

amount of discomfort and general disturbance as oxyuris. It is a common enough occurrence for a medical man to be consulted by a healthy adult who has passed an ascaris or two, which he takes for garden worms, and to hear of no particular symptoms to which they have given rise, but only of the surprise which their unexpected appearance has caused. Again, as noted by Manson in his "Tropical Diseases", if the faeces of Europeans coming from warm climates are systematically examined with the microscope they will, in a large proportion of cases, be found to contain the ova of *Ascaris Lumbricoides*, *Trichocephalus Dispar*, and *Anchylostomum Duodenale*. He mentions elsewhere that in Beri-Berics subjected to clinical examination fifty per cent of the cases may be found to contain in the intestine the ova of *Trichocephalus* or of *Anchylostomum*, so as to possibly /

possibly lead an inexperienced observer to imagine some causal connection between this fact and the existence of Beri Beri. Did the presence of any of those worms habitually produce the amount of annoyance and unfitness for work caused in adults by the presence of Oxyuris, practitioners in the Tropics would often have the fact brought under their notice.

In connection with this contrast I may mention the case of a gentleman whom I treated in India. He had suffered as a child in Europe from Oxyuriasis, but as an adult only when in depressed health from other reasons. In India he did not during the Cold weather suffer from his old complaint at all, but had to be constantly on the lookout during the Hot weather, especially when he was stationed in a district where the heat was very intense and prostrating, though in a station with a
more /

more equable temperature he could pass the whole year without a recurrence of the complaint. This gentleman had become the host of a *Taenia Mediocanellata*, which he had harboured for two years, successive doses of Extract of Male Fern only sufficing to bring away the worm without the head.

But he assured me that the small amount of annoyance and discomfort attending the presence of the *Taenia* was as nothing compared with the miseries he associated with oxyuriasis. This gentleman since he began to harbour the *Taenia* had not had but one attack of oxyuriasis, and that one shortly after one of his periodic doses of Extract of Male Fern had temporarily relieved him of the presence of the *Taenia*, and he had formed the idea that the presence of the larger parasite kept away the smaller ones. If this were really the cause of his immunity from the /

the oxyuris, he assured me, he almost feared the arrival of the day when a dose of Male Fern more successful than usual should deprive him of his protector !

Nor, judging by analogy, need it be said that the idea of the incompatibility of the presence of the two parasites is necessarily an incorrect one, there being many instances of the kind both in the animal and the vegetable world.

CONDITIONS FAVOURING THE PARASITE :

In adults especially oxyuriasis is often associated with a chronic catarrh of the lower part of the bowel, how much so as a cause and how much as an effect it is hard to say. Such irritation as the parasites produce is quite an obviously possible cause of chronic local catarrh, especially in persons who become more liable by increasing age to /

to it than they were before, but it would also appear that the parasites find a suitable nidus for their growth and development and possibly a protection for their ova in the thick viscid mucus secreted by those who are liable to chronic catarrh.

It is a point often noticed that constipation is apt to render a susceptible patient more liable to attacks than he would otherwise be. This has an obvious explanation, that the delay in the passage of the general intestinal contents affords more time for development and multiplication to the parasites than they would otherwise have. Such patients are for this reason exceedingly careful not to allow themselves to become constipated. This aggravation of the condition by constipation interposes a difficulty in the treatment by laxatives, often the only one offered by the medical man, as the reaction from the laxative sometimes causes /

causes constipation which has a tendency to bring about a recurrence of the condition, since, as is nearly always the case, treatment by mere purgatives or laxatives leaves a considerable proportion of the parasites behind in the bowel, and especially in the coecum.

CONDITIONS FAVOURING LOCAL MULTIPLICATION:

It is this constant tendency to a relapse under conditions favouring it without apparent opportunity of re-infection from above that forces one after an experience of several cases to the conclusion that re-infection is not invariably necessary in order that a local development of the parasite, with complete life-cycle, may occur. What, then, are the conditions that give to Oxyuris this peculiar property of being able, under them, to develop in such /

such numbers so suddenly and so surely, without the concurrence of any circumstance favouring re-infection from above ? The answer is that the condition necessary is the provision in the host's food of a pabulum suited to the requirements of the parasite. The matter is practically entirely one of diet. And in this connection the care as regards diet has to be exercised not, as in the case of, say the different Taeniae, against those articles of food that will convey the undeveloped parasite, but against those that will afford the parasites the food favourable to their growth and development while in the intestine of the host.

FOODSTUFFS IN THEIR RELATION TO THE DISEASE:

It is this point, familiar through a lifetime to a certain few unfortunate laymen, but curiously unfamiliar to the profession, that is the crux /

cruz of the whole matter.

Clinically, when such cases are studied (and the fact of the weakness being hereditary enables one to get access to more cases than one otherwise might, the disease in this chronic form not being particularly common) it is found that the great bulk of the food-stuffs to which our attention has to be directed belong to the vegetable and not to the animal kingdom.

In certain persons, and this reservation is of course important, the taking of any product of the vegetable kingdom in a raw and uncooked condition will practically inevitably produce oxyuriasis, and this without any means for the introduction of the parasite being in operation that was not so before the error in diet occurred.

Nor is it always necessary that the vegetable food /

food should be uncooked for this to happen. Green vegetables of all kinds and potatoes, even well cooked, are avoided by sufferers of experience. Fruits of all kinds and especially pulpy ones, such as apples and plums, have a very marked tendency to excite the condition, and this not always necessarily when taken raw. The tendency is very much more marked in the case of unripe than in the case of ripe fruit. Dried fruits, such as dried figs and prunes, either raw or stewed, can be eaten with impunity by many of the cases. Oranges seem to form a curious exception to the rule of fresh fruit being injurious, as they can sometimes be eaten when no other fruit can, always provided that the white pulp of the rind is carefully peeled off and that pips crushed by the teeth are not accidentally swallowed.

Nuts of any kind whatever are perhaps the most /

most certain of all vegetable foods to excite the condition. I have found indiscretion in the matter of almond paste on cake the cause of more than one relapse in the case of a patient who had taken great pains to relieve himself of the parasites, and who did not realize what the paste consisted of that had brought about the recurrences in his case.

This point clinically noted in a series of cases, we next come to the question of what it is about those food-stuffs that renders them such a suitable pabulum for the oxyuris.

A priori, considering the habitat of the parasite, low in the bowel, we should imagine that the food-stuffs on which it would mostly depend would be those that leave a large residue to pass on to the large intestine, and this is exactly the feature that is so much more marked in the case of the /

the products of the vegetable kingdom than in those of the animal, and in the case of uncooked vegetable food than in the case of cooked.

Pulpy fruits and stringy vegetables leave a considerable residue, and one finds it better for oxyuris patients to avoid them. Unchanged starch granules are sure to pass through the bowel in large quantity, and one finds an experienced oxyuris patient sending away untasted a farinaceous pudding imperfectly cooked.

The juices of the vegetable substances are of themselves harmless, though they are difficult to obtain free from any pulpy or stringy matter. I have in my mind the case of one of my patients who, when there was broth at dinner, sometimes used to partake of it strained, though he gave up doing this on account of the difficulty of getting the broth so strained as to be palatable and yet with everything excluded /

excluded that might be harmful.

The only animal food that, as far as I am aware, excites the condition in those susceptible (i.e. in those in whom a few parasites must always exist, to break out into sudden development given the necessary pabulum) is cheese, and that must, for an animal food, leave a relatively very large residue.

This tendency of cheese to produce oxyuriasis in those liable to it was pointed out to a patient of mine by a famous Edinburgh surgeon, now dead, but whose gaunt and careworn appearance I well remember. He was a great and life-long sufferer from oxyuriasis, and cheese was a thing he always avoided. I have myself seen it excite oxyuriasis in a patient who, being in better general health than he had formerly enjoyed, had gradually returned to an ordinary /

ordinary diet so far as most things went, not having found oxyures in his stools for years. But one meal of bread and cheese produced anal itching in about eighteen hours and next day oxyures appeared alive in the stools.

Dried fruits are not so liable to excite the condition as fresh fruits for the same reason that they are by dyspeptic patients found to be more digestible. Their mellowing under the disintegrating influences of chemical change produces the greater digestibility that renders them a more suitable food than before for the dyspeptic patient and the sufferer from oxyuriasis.

PROPHYLAXIS AND TREATMENT :

such being the most practically important point in the aetiology of Oxyuriasis, a treatise on the /

the treatment would practically resolve itself into a re-iteration of the facts of the few preceding pages. During an actual attack an enema of quassia and common salt is as good a treatment as any, but purgatives are to be avoided for the reason above given. Iron, if administered, as it is sometimes, in small doses continued over a period of time, must be combined with strychnia or some other drug that will just counteract its tendency to constipate.

The securing of regularity of the bowels will be seen to be an important feature of the prophylaxis. Precautions as to cleanliness of the person, such as washing of the anus and hands after defaecation, the checking of biting of the nails if the habit exists (and it is not always confined to children) and so forth, will readily suggest themselves.

But /

But the absolute essential is the regulation of the diet in accordance with the facts given above. Hard and fast rules cannot be laid down as the cases differ, and the same person will when in good health be able to eat what he could not otherwise with impunity. Patients readily learn themselves what they can eat and what they dare not, once they are put on the right lines.

Briefly speaking, those are, to eat no fresh fruits especially if pulpy or if unripe, and no salads, to avoid underdone vegetables and insufficiently boiled farinaceous foods, absolutely to eschew anything in the shape of kernels, and never to touch cheese.

As regards cooked vegetables, each patient must judge for himself. Some can take them with impunity; others find even well-done potatoes risky.

To those who find the deprivation of vegetables, fruit and cheese a hardship, a great luxury is a handful of well-dried raisins, dates or prunes after dinner.

CONCLUSION :

We have seen that the *Oxyuris vermicularis* is a parasite whose life-history outside the body is imperfectly known, that there is no proof that it cannot pass through a series of generations in the body of its primary host without leaving it, and that the supposition that it can is indicated by the fact that in certain susceptible persons the injection of certain articles of diet leaving a large residue to pass into the lower bowel brings about a sudden development of oxyures so certain in its onset as to preclude the idea that new ova must necessarily /

necessarily also be ingested on each occasion to cause this development.

The question of what is the usual food of intestinal parasites is one generally answered by the somewhat vague statement that they thrive on the intestinal juices. Whether there are others besides oxyuris that find their principal nutriment in the residue of their host's food is an interesting question which opens up a little-discussed aspect of helminthology. I have not found the redevelopment of *Taeniae* broken off at the neck hindered by alterations in diet, but I have not made observations on patients suffering from other forms of helminthiasis. The subject is one of considerable interest, and well merits the attention of those who have the opportunity of conducting researches into it.